GRADUATE SCHOOL
IN SCIENCE, ENGINEERING
& ECONOMICS
IN PARIS
Why ‘MINES ParisTech’

- ‘Ecole des Mines’ founded in 1783
  At that time ‘mining = forefront technology’

- Evolved strongly over the centuries
  - With new technologies: coal, electricity, electronics, computing
  - Always involving research in economics and management

- Today, among the top institutions in applied mathematics, applied physics, economics and social sciences

- The historical name ‘MINES’ remains but we are no longer a ‘specialized mining school’!
- Reporting to the Ministry of Industry and Finance

- Today we are part of “Paris Sciences et Lettres” University.

- Attached by convention to “Institut Mines Telecom” (Ministry in charge of Industry)
Why ‘MINES ParisTech’

- Founding member of ParisTech

- ParisTech = **Paris Institute of Science and Technology**
  - Consortium of 10 excellence institutes in science, engineering, economics and business
  - Leaders in their fields
25 historical high research universities, centers and schools in the heart of Paris (ENS, Collège de France, Institut Curie, EHESS, Paris-Dauphine, CNRS, INRIA, INSERM, ESPCI ParisTech, …)

10 nobel Prizes, 10 medal fields (mathematics), 34 CNRS gold medals

Rankings:
- QS Ranking: 50th worldwide (1st in France)
- THE Ranking: 41th worldwide (1st in France)
- Potential Shanghai Ranking: 26th worldwide

Common strategy in Msc (Material Sciences & Energy) and PhD

Very few high selected international partner universities
- Cambridge University (UK)
- National Taiwan University
- New York University (USA)
- Columbia University (USA)
- Australian National University
- …
4 locations

- **Paris**: Paris downtown (Quartier Latin)
- **Evry**: 30 km south of Paris
- **Fontainebleau**: 60 km south-east of Paris
- **Sophia-Antipolis**: on the “Côte d’Azur”, 20 km from the city of Nice
MINES ParisTech in figures

- **2,000 PEOPLE**
  - 800 employees including **230 faculty members**
  - 1,200 students:
    - 500 at Master level / Engineering
    - 300 at Post-Master level (short programmes)
    - 400 at PhD level

- **2nd best university in engineering in France**
- **1st University in France for its links with industry**
- **35% International students**
- **1/3 International teachers**

- **EDUCATION**
  - Master in Science and executive engineering
  - International Masters
  - PhD
  - Advanced Masters programs

- **The library**
- **Student/prof ratio**
• From 2018 Mines ParisTech is ranked internationally under the banner of its university PSL
Innovation and entrepreneurship

• **Innovation at the heart of our history and strategy**
  – In our relations with industrial partners
  – Companies created by Mines ParisTech Alumni
  – Pre-incubator, Entrepreneurship Price: MINES ParisTech-Criteo

• **Innovation, a transdisciplinary discipline**
  – Department Management, Society, Economy
  – Chair « Theory and Methods of Innovative Conception »
  – Interdisciplinary Institute of Innovation (i3)

• **Participation in public debate**
Research at MINES ParisTech

5 departments
- Energy and process engineering
- Earth sciences and environment
- Mathematics and complex systems
- Materials and mechanics
- Economy, management and society

18 research labs
- Energies of the future
- Transport and mobility
- New materials
- Health and environment
- Innovation and competitiveness

1000/year Research contracts
30 K
200 industrial partners
27 industrial chairs
400 scientific publications rank A

Maurice ALLAIS - Economics - 1988
Georges CHARPAK – Physics - 1992

2 Nobel prizes

1st University in France for the amount of contractual research
Applied mathematics and systems

Research at MINES ParisTech

Main research topics

- Image processing and mathematical morphology
- Mobile Robotics and Software Environments
- Point Cloud and 3D Modeling
- Virtual Reality and Augmented Reality
- Machine learning in production and logistics
- Control and optimization
- Information technology and programming languages
- Automatization and Systems
- Bio-informatics and data analyses: computational biology, statistics, precision medicine, bioimaging, computer vision, chemoinformatics, genetics, systems biology, big data
- Modeling methods to help decision-making

Research centers and groups

- Centre of robotics (CAOR)
- Centre for bio-informatics (CBIO)
- Centre Automatic Control and Systems (CAS)
- Centre of Applied Mathematics (CMA)
- Centre of Mathemacial Morphology (CMM)
- Centre of Computer Sciences (CRI)

143 faculty members
Energy and process engineering

Research at MINES ParisTech

Research centers and groups
- Centre for Energy Efficiency of Systems (CES)
- Centre Thermodynamics of Processes (CTP)
- Centre Observation, Impacts, Energy (O.I.E.)
- Centre for Processes, Renewable Energies and Energy Systems (PERSEE)

Main research topics
- Energy efficiency of Systems
- Thermodynamic of Processes
- Observation, Impacts, Energy
- Processes, renewable energies and energy systems

155 faculty members

Hydrogen production by plasma
Air conditioning
Artificial sun
Main research topics:
- Increase lifetime
  - Damage, ageing and fracture mechanisms
- Improve materials properties
  - Microstructure optimisation
  - Microstructure control during parts forming
- Reduce environmental impacts
  - Lighter structures design
  - Bio-sourced materials development
- Develop new materials and processes
- Materials simulations

Research centers and groups:
- Centre of Material Transformation (CEMEF)
- Centre of Material Engineering (MAT)

276 faculty members
Earth Sciences and Environnement

Research at MINES ParisTech

Research centers and groups
Centre for Geosciences (GEOSCIENCES)
Higher Institute for Environmental Engineering and Management (ISIGE)

117 faculty members

Main research topics:

- **Geosciences:**
  - Geology
  - Geophysics
  - Geostatistics
  - Civil and mining Eng.
- **Environment engineering and management**

Gas storage
Economics, management and society

Research at MINES ParisTech

Research centers and groups

Centre for Industrial Economics (CERNA)
Centre for Management Science (CGS)
Research Center on Risks and Crisis (CRC)
Centre for the Sociology of Innovation (CSI)

Main research topics

- Industrial Economics
- Scientific management
- Sociology of innovation
- Hazards and Risks sciences
Educational programs offered

- **baccalauréat**
  - 1
  - 2

- **Licence**
  - 3
  - 4
  - 5

- **Diplôme d’ingénieur (engineering degree)**

- **Masters of Science (professional or research)**
  - 6
  - 7
  - 8

- **PhD * Doctorat**

- **Advanced Master**
The Universities / ‘Grandes Ecoles’ system

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'’Bac’ = end of secondary studies exam

- More than 250 science and engineering “Grandes Ecoles”!
- 4 most selective ones:
  - Ecole Normale Supérieure
  - Ecole Polytechnique
  - MINES ParisTech
  - Ecole Centrale Paris
- Admission through ‘Preparatory classes’: 2 years of **very intensive undergraduate** studies carried out in honours classes, ended with **national competitive** exams
Mines ParisTech educational programs

Diplôme d’ingénieur – MSc in sciences and executive engineering

The philosophy:
- To train engineers with a strong scientific background, prepared to become managers, in any kind of companies, all over the world.

The program:
- Strong background in fundamental courses,
  - Mathematics, physics, mechanics …
- with a multidisciplinary approach:
  - Social sciences, Languages, Sports, Economy and management, Innovation and entrepreneurship
- and the possibility to customize your curriculum with 18 fields of specialization:
  - Applied mathematics, Information technology, Control engineering and computer science, Computational Biology, Earth and environmental sciences, Materials sciences and engineering, Energy and chemical engineering, Economics and social sciences

Top 1% of scientific students in France admitted
60% of the students employed even before being available
49 k Average salary (first position)
Mines ParisTech educational programs

- Masters (PSL)
  - Materials science and Engineering
  - Master in Energy

- Advanced Masters (and continuing education)
  - Materials, Processing and Modeling (MAPMOD)
  - International Environmental Management (ENVIM) together with Tsinghua University
  - International Energy Management (ALEF) together with Tsinghua University
  - CESECO : Analyse technique et économique des opérations minières à ciel ouvert
    - Technical and economical analysis of open-pit mining operations

- PSL-ITI: Institut de Technologie et d’Innovation
  - Preparation to PhD: ‘year 0’: courses, research, start-up business plan… in multidisciplinary fields

- Research internship at Bsc 4 or MSc1 or MSc 2 level in one of above mentioned research centers

- PhD in one of above mentioned research centers
International relations

35% of international students

20% Of outgoing students for exchange

100% of ours students in internship abroad

Relations with the Republic of Korea :

Agreement with SNU in 2007
Agreement with KAIST in 2009
Agreement with POSTECH in 2015
5 student from ROK (two exchanges, 3 for double Master)